

portions of Lewis county (adjoining Oswego county to the eastward), and more or less injury was done to crops, especially in the uplands.

Fort Buford, Dak.: the first frost of the season occurred on the 18th, and caused some injury to vegetation.

Albany, N. Y.: the first frost of the season occurred on the 17th, causing slight damage to late vegetation.

Vienna, Johnson Co., Ill.: a heavy frost occurred during the night of the 23d-24th, causing considerable damage.

Owensborough, Daviess Co., Ky.: a heavy frost occurred throughout this county during the night of the 23d-24th. Tobacco in the lowlands, which, owing to the drought, constitutes about three-fourths of the entire crop, was seriously injured, and vegetables were killed.

Grand Haven, Mich.: heavy frost occurred on the morning of the 24th, doing considerable damage to tender vegetation throughout this part of Michigan.

Jackson, Cape Girardeau Co., Mo.: the first frost of the season occurred on the morning of the 24th; vegetation was only slightly injured.

Sycamore, DeKalb Co., Ill.: the heavy frost on the 24th did much damage in this county.

Champaign, Champaign Co., Ill.: heavy frost occurred on the morning of the 24th, killing tender vegetation. Reports from Duquoin, Perry Co., Tolono, Champaign Co., Marshall, Clarke Co., and Taylorville, Christian Co., state that frosts occurred on the above date in those localities, but no serious injury resulted.

College Hill, Hamilton Co., Ohio: the first frost of the season occurred on the 24th; tomato, pumpkin, and cucumber vines were seriously injured.

Columbus, Ohio, the light frost of the 24th caused slight damage to crops in this vicinity; reports from the northwestern counties indicate that frost seriously injured tobacco.

Bristol, Sullivan Co., Tenn.: a heavy frost occurred during the night of the 24-25th. Farmers report that the tobacco crop was seriously injured.

Henderson, Henderson Co., Ky.: the damage done to the tobacco crop by the frost of the 25th is estimated at about 10 per cent. of the entire crop.

Hopkinsville, Christian Co., Ky.: the frost on the morning of the 25th damaged tobacco considerably on low ground, but on high land the damage was slight.

Wytheville, Wythe Co., Va.: heavy frosts occurred on the mornings of the 25th and 26th; no serious damage resulted.

Blue Ridge, Botetourt Co., Va.: light frosts occurred on the 24th, 25th, and 26th; no appreciable damage was done to tobacco.

Lynchburg, Va.: heavy frost was reported in the surrounding country on the morning of the 25th, doing considerable damage to crops, particularly tobacco.

Variety Mills, Nelson Co., Va.: the first frost of the season occurred on the 25th; sweet potato vines, corn, beans, and tobacco sustained serious injury; this is the earliest damaging frost that has occurred at this place during the last thirteen years.

Asheville, Buncombe Co., N. C.: a heavy frost occurred during the night of the 24-25th; about one-fourth of the outstanding tobacco was damaged.

Henderson, Vance Co., N. C.: tobacco on lowlands was slightly damaged by frost on the 25th.

Statesville, Iredell Co., N. C.: the heavy frost on the 25th did considerable damage to tobacco.

Raleigh, N. C.: the first frost of the season occurred on the 25th, and although no damage occurred in this vicinity, reports from the western part of the state indicate that the tobacco crop sustained serious injury.

Columbia, S. C.: light frost is reported to have occurred during the night of the 24-25th, injuring tender plants.

Baltimore, Md.: "The Sun" of the 28th states that although the frost on the morning of the 26th was quite heavy throughout the lower counties of Maryland, no considerable damage seems to have resulted.

Winchester, Frederick Co., Va.: a heavy frost occurred in this vicinity during the night of the 25-26th, injuring all kinds of vegetation.

Abingdon, Washington Co., Va.: about one-third of the tobacco crop was injured by the frosts of the 25th and 26th. Reports from Lovingson, Nelson Co., Buchanan and Fincastle, Botetourt Co., state that the frost on the above dates were light and caused but little damage.

Danville, Pittsylvania Co., Va.: a light frost occurred on the morning of the 25th; the tobacco crop in this vicinity suffered no serious injury in conse-

quence, but considerable damage is reported from Henry county and the counties bordering on the mountains.

Martinsville, Henry Co., Va.: the tobacco crop was more or less seriously damaged by frost on the 26th.

Christiansburg, Montgomery Co., Va.: frosts on the mornings of the 25th and 26th caused considerable damage to the outstanding tobacco.

Winston, Forsyth Co., N. C.: it is estimated that about one-third of the tobacco standing in the fields was damaged by the frost which occurred during the night of the 25-26th. About one-half of the entire crop was standing when the frost came.

Wellsborough, Tioga Co., Pa., 30th: frequent frosts occurred during the month, but no material damage was done until the 26th and 27th, on which dates frost damaged buckwheat and late potatoes in this vicinity.

ICE.

Ice formed in the various states and territories during the month, as follows:

Dakota.—Fort Totten, 16th; Highmore, 23d.

Illinois.—Champaign and Charleston, 24th.

Indiana.—Vevay, 13th, 19th, and 20th.

Iowa.—Albia, ice formed ten miles south of this place on the 16th.

Michigan.—Hudson and Lansing, 23d.

Minnesota.—Moorhead, 15th.

New Hampshire.—Mount Washington, frost work and ice formed on the anemometer cups on the 8th and 25th; and ice formed on water on the 17th; Berlin Mills, 17th.

New Jersey.—Moorestown, 25th and 26th.

New York.—Starkey, ice formed a few miles south of this place on the 17th; Humphrey, 17th and 25th; Factoryville, 26th; Montgomery, ice formed in the lowlands in this vicinity during the night of the 16-17th.

Ohio.—Napoleon and Wauseon, 24th.

Pennsylvania.—Grampian Hills, 26th.

Virginia.—Dale Enterprise, 26th.

Texas.—Thomas C. Osborn, M. D., voluntary observer at Cleburne, reports: "Ice on well rope at 6 a. m. the 29th."

Wisconsin.—Embarras, 16th, 23d, and 24th. Milwaukee, 24th.

Wyoming.—Cheyenne, 27th and 28th.

TEMPERATURE OF WATER.

The following table shows the maximum, minimum, and mean water temperature, as observed at the harbors of the several stations; the monthly range of water temperature; the average depth at which the observations were made, and the mean temperature of the air:

Temperature of water for September, 1887.

Station	Temperature at bottom.				Mean temperature of the air at station.	Average depth of water, feet and tenths.
	Max.	Min.	Range.	Monthly mean.		
Canby, Fort, Wash.....	60.8	55.0	5.8	58.0	55.4	14.2
Cedar Keys, Fla.....	87.1	77.1	10.0	81.4	77.6	8.1
Charleston, S. C.....	82.3	71.6	10.7	76.9	74.0	37.0
Eastport, Me.....	53.7	51.3	2.4	52.1	54.6	17.6
Galveston, Tex.....	85.9	71.7	14.2	81.2	79.7	15.5
Key West, Fla.....	87.0	79.8	7.2	84.8	81.4	21.9
New London, Conn.....	68.3	62.6	5.7	65.4	61.2	12.1
New York City.....	71.4	62.5	8.9	67.5	63.1	15.4
Pensacola, Fla.....	85.4	75.2	10.2	80.5	77.6	18.4
Portland, Me.....	59.1	53.4	5.7	56.2	57.8	17.8
Portland, Oregon.....	64.0	59.5	4.2	61.8	59.6	55.6

PRECIPITATION (expressed in inches and hundredths).

The distribution of precipitation over the United States and Canada for September, 1887, as determined from the reports of about eight hundred stations, is exhibited on chart iv. In the table of miscellaneous meteorological data are given, for each Signal Service station, the total precipitation, with the departures from the normal. The figures opposite the names of the geographical districts in columns for mean temperature, precipitation, and departures from the normal, show respectively the averages for the several districts. The normal for any district may be found by adding the departure to the

current mean when the precipitation is below the normal, and subtracting when above.

In portions of the Rio Grande, Missouri, and upper Mississippi valleys, in the northern and middle slopes, southern Rocky Mountain districts, and over portions of the northern plateau and north Pacific coast region, the precipitation for September, 1887, is in excess of the average; it is also excessive in southern and eastern Florida, and in the southern portions of Alabama, Mississippi, and Louisiana. The most marked excess (more than four inches) is that for the Rio Grande Valley,

due to heavy rains accompanying the storm described as number vii under "Areas of low pressure." In the southern plateau the precipitation is unusually heavy for that region, the average for the district being about double the normal amount. The large excess of 1.10, as given in the table of miscellaneous meteorological data, for the northern slope is due in great part to the exceptionally heavy rainfall at Fort Maginnis, Mont., which appears to have been local.

The precipitation for September, 1887, is deficient in the following districts: In the northern portion of Georgia, Alabama, Mississippi, and Louisiana; in Missouri, Arkansas, Indian Territory, Texas (except along the Rio Grande); in the states bordering on the Atlantic, and over an area extending from the lower lakes to, and including, Tennessee, except in the vicinity of Nashville, where a large excess, apparently local, occurs. The greatest deficiency occurs in the south Atlantic states, where the rainfall is less than one-third of the average for the month, while in the west Gulf states but little more than half of the usual amount of rain fell. In New England the deficiency amounts to about 1.00.

The following are some of the most marked departures from the normal precipitation at Signal Service stations where the meteorological records cover eight, or more, years of observations:

Above normal.		Below normal.	
	Inches.		Inches.
Brownsville, Tex.	5.76	Hatteras, N. C.	6.29
Fort Davis, Tex.	4.59	Galveston, Tex.	5.49
Prescott, Ariz.	3.80	Charleston, S. C.	5.01
Yankton, Dak.	3.77	Southport, N. C.	4.69
North Platte, Nebr.	3.76	Cedar Keys, Fla.	3.85
Nashville, Tenn.	3.35	Escanaba, Mich.	3.70
Fort Grant, Ariz.	3.33	Savannah, Ga.	3.47
Rio Grande City, Tex.	3.10	Marquette, Mich.	3.07

DEVIATIONS FROM AVERAGE PRECIPITATION.

The following table shows for certain stations, as reported by voluntary observers, (1) the average precipitation for a series of years; (2) the length of record during which the observations have been taken, and from which the average has been computed; (3) the total precipitation for September, 1887; (4) the departures of the current month from the average; (5) and the extreme monthly precipitation for September during the period of observations and the year of occurrence:

State and station.	County.	(1) Average for the month of Sept.	(2) Length of record.	(3) Total for Sept., 1887.	(4) Departure from average.	(5) Extreme monthly precipitation for September.			
						Greatest.		Least.	
		Inches.	Years.	Inches.	Inches.	Am't.	Year.	Am't.	Year.
Arkansas.									
Lead Hill.	Boone.	4.58	6	4.69	+ 0.11	8.44	1886	1.52	1883
California.									
Sacramento.	Sacramento.	0.13	21	0.06	- 0.07				
Connecticut.									
Canton.	Hartford.	3.62	26	2.39	- 1.23				
Middletown.	Middlesex.	3.35	29	1.76	- 1.59				
Wallingford.	New Haven.	3.46	29	2.12	- 1.34				
Dakota.									
Webster.	Day.	3.18	5	0.88	- 2.30				
Illinois.									
Aurora.	Kane.	2.95	9	4.33	+ 1.38				
Collinsville.	Madison.	3.58	5	2.33	- 1.25				
Golconda.	Pope.	3.67	10	5.19	+ 1.52				
Mattoon.	Coles.	3.46	7	3.10	- 0.36	5.30	1885	0.80	1883
Peoria.	Peoria.	3.33	32	2.33	- 1.00				
Riley.	McHenry.	3.86	26	4.61	+ 0.75				
Sycamore.	De Kalb.	3.71	7	3.27	- 0.44				
Indiana.									
Blue Lick.	Clark.	3.46	6	2.86	- 0.60	6.59	1884	1.05	1883
Connersville.	Fayette.	2.59	6	2.17	- 0.42	5.09	1884	1.39	1882
Lafayette.	Tippecanoe.	3.59	8	3.02	- 0.57	4.52	1886	1.88	1882
Logansport.	Oss.	2.98	33	2.50	- 0.48	7.08	1886	0.24	1882
Sunman.	Ripley.	3.90	5	3.42	- 0.48	5.85	1884	1.52	1886
Vevay.	Switzerland.	3.56	21	3.39	- 0.17	6.72	1868	0.47	1871
Worthington.	Greene.	3.21	6	1.84	- 1.37	5.74	1885	1.68	1882
Iowa.									
Cresco.	Howard.	4.27	14	7.50	+ 3.23				
Monticello.	Jones.	4.07	34	6.31	+ 2.24	10.15	1882	0.00	1871
Kansas.									
Independence.	Montgomery.	3.72	14	3.82	+ 0.10				
Lawrence.	Douglas.	3.49	20	5.73	+ 2.24				
Wellington.	Sunman.	3.91	9	2.50	- 1.41				
Yates Centre.	Woodson.	3.96	7	3.58	- 0.38				

Deviations from average precipitation—Continued.

State and station.	County.	(1) Average for the month of Sept.	(2) Length of record.	(3) Total for Sept., 1887.	(4) Departure from average.	(5) Extreme monthly precipitation for September.			
						Greatest.		Least.	
		Inches.	Years.	Inches.	Inches.	Am't.	Year.	Am't.	Year.
Maine.									
Cornish.	York.	3.18	30	0.67	- 2.51				
Gardiner.	Kennebec.	3.22	49	1.05	- 2.17				
Lewiston.	Androscoggin.	3.40	13	0.88	- 2.52				
Orono.	Penobscot.	3.25	19	0.95	- 2.30				
Maryland.									
Cumberland.	Allegany.	2.67	16	3.68	+ 1.01	8.50	1882	0.38	1886
Fallston.	Harford.	4.21	17	4.26	+ 0.05	12.95	1876	0.23	1884
Massachusetts.									
Amherst.	Hampshire.	3.27	53	1.42	- 1.85				
Cambridge.	Middlesex.	3.49	46	1.12	- 2.37				
Chestnut Hill.	Middlesex.	2.60	12	1.35	- 1.25				
Framingham.	Middlesex.	2.32	13	1.29	- 1.03				
Lake Cochituate.	Middlesex.	3.37	36	1.27	- 2.10				
Ludlow.	Hampden.	2.82	12	1.45	- 1.37				
Lynn.	Essex.	2.67	13	1.22	- 1.45				
Mystic Lake.	Middlesex.	2.45	12	1.54	- 0.91				
New Bedford.	Bristol.	3.53	74	1.68	- 1.85				
Somerset.	Bristol.	2.67	17	1.46	- 1.21				
Springfield.	Hampden.	3.26	40	1.84	- 1.42				
Waltham.	Middlesex.	3.26	63	1.59	- 1.67				
Nevada.									
Carson City.	Ormsby.	0.16	9	0.11	- 0.05				
New Brunswick.									
Saint John.	Saint John.	3.76	27	2.63	- 1.13				
New Hampshire.									
Concord.	Merrimac.	3.42	32	0.82	- 2.60				
Hanover.	Grafton.	2.78	23	0.91	- 1.87				
New Jersey.									
Dover.	Morris.	3.35	5	1.94	- 1.41				
New York.									
Factoryville.	Tioga.	2.21	6	2.57	+ 0.36				
Humphrey.	Cattaraugus.	4.39	3	3.09	- 1.30	4.82	1884	3.09	1887
Palermo.	Oswego.	3.10	34	2.33	- 0.77				
Ohio.									
North Lewisburg.	Champaign.	3.26	15	2.05	- 1.21				
Wauseon.	Fulton.	2.53	15	1.70	- 0.83	5.29	1879	0.55	1871
Pennsylvania.									
Dyberry.	Wayne.	2.52	18	2.18	- 0.34				
South Carolina.									
Stateburg.	Sumter.	3.43	7	0.75	- 2.68	6.67	1884	0.75	1887
Texas.									
New Ulm.	Austin.	5.68	16	3.26	- 2.42	15.08	1874	0.90	1872
Vermont.									
Newport.	Orleans.	4.37	13	1.92	- 2.45				
Strafford.	Orange.	3.39	13	1.70	- 1.69	6.30	1882	0.70	1884
Virginia.									
Bird's Nest.	Northampton.	3.24	19	1.85	- 1.39				
Dale Enterprise.	Rockingham.	3.58	7	2.10	- 1.48				
Variety Mills.	Nelson.	2.72	8	2.73	+ 0.01	7.18	1882	0.04	1884
Wytheville.	Wythe.	3.50	23	4.88	+ 1.38				
West Virginia.									
Helvetia.	Randolph.	4.37	10	3.49	- 0.88				

SLEET.

Sleet fell on Pike's Peak, Colo., on the 23d, 25th, and 26th; on Mount Washington, N. H., on the 15th and 16th; and at Webster, Dak., on the 22d.

SNOW.

Fort Assinaboine, Mont.: snow was observed falling on the Bear Paw Mountains to the southeast, and on the Sweet Grass Hills to the northwest of this station on the 2d.

Oroville, Cal.: at 1 a. m. on the 5th snow covered the high peaks of the mountains north and east of this place.

Salt Lake City, Utah: the first snow of the season fell on the mountains southeast of this city during the night of the 11-12th.

Fort Maginnis, Mont.: snow fell on neighboring mountains, at an altitude of about 1,000 feet above this station, on the 2d. On the 12th snow was observed on the mountains in this vicinity.

Deadwood, Dak.: light snow fell on the 12th at Lead City, four miles south, and along the stage road twenty miles east of this city.

Farmington, Franklin Co., Me.: snow fell during the morning of the 25th, covering the tops of neighboring mountains.

MONTHLY SNOWFALLS (inches and tenths).

The following monthly snowfalls have been reported:

Mount Washington, N. H., on the 24th and 25th, 2.0; Camp Sheridan, Wyo., 0.6, on the 11th; Pike's Peak, Colo., trace, on the 25th and 26th; Cheyenne, Wyo., trace, on 12th, 25th, and 26th; Fort Maginnis, Mont., trace, on the 12th.

Table of excessive and greatest monthly precipitation for September, 1887.

Station.	Specially heavy.		Largest monthly.	Station.	Specially heavy.		Largest monthly.
	Date.	Amt.			Date.	Amt.	
Alabama.				Louisiana.			
Mobile.....	27	4.57	6.21	Lafayette.....	27	3.20	6.96
Marion.....	17	3.25		New Orleans.....	27	2.88	6.51
Do.....	27	2.14		Coushatta.....	26, 27	3.17	
Evergreen.....	27, 28	2.07		Natchitoches.....	26, 27	2.60	
Livingston.....	16, 17	2.10		Grand Coteau.....	27	3.00	
Scottsborough.....	27	2.00		Monroe.....	26, 27	2.60	
Selma.....	27, 28	3.20		Maryland.			
Mount Vernon.....	26, 27	4.38		Cumberland.....	11, 12	2.25	
Arizona.				Fallston.....	11, 12	2.09	
Fort McDowell.....	10, 11	2.69	8.23	Michigan.			
Do.....	30	4.11		Adrian.....	21	2.63	6.66
Fort Huachuca.....	9	2.52		Kalamazoo.....	28, 29	2.10	
Fort Grant.....	8, 9	3.34		Hudson.....	22	2.09	
Prescott.....	11, 12	3.69		Coldwater.....	21, 22	3.38	
Arkansas.				Athens.....	21, 22	2.00	
Monticello.....	23	2.10		Grand Haven.....	5, 6	2.15	
Russellville.....	22, 23	2.60		Minnesota.			
Dakota.				Minneapolis.....	1 to 3	3.13	
Yankton.....	21	2.14	6.70	Ortonville.....	26	2.08	
Highmore.....	1, 2	3.50		Mississippi.			
Florida.				Natchez.....	27	2.50	
Merritts Island.....			11.96	Edwards.....	23	2.00	
Jacksonville.....	17 to 19	7.17	9.40	Vicksburg.....	26, 27	2.45	
Alva.....	18, 19	2.75	7.88	Missouri.			
Ft. St. Augustine.....	19	4.00	7.80	Miami.....			6.48
Key West.....			7.30	Sedalia.....			6.04
Titusville.....	4	2.17	6.32	Fayette.....	28, 29	2.10	
Fort Meade.....	19	2.90	6.27	Nebraska.			
Do.....	30	2.10		Genoa.....	1	10.60	11.34
Tallahassee.....	28	3.20		Tecumseh.....	1, 2	2.50	
Duke.....	19, 20	3.32		Brownville.....	25, 26	3.00	
Limona.....	20	2.08		Harvard.....	1	2.00	
Pensacola.....	27	2.19		Do.....	25	2.00	
Georgia.				North Platte.....	1, 2	2.46	
Toccoa.....	27, 28	4.21		New Jersey.			
West Point.....	17	2.10		Rancocas.....			6.25
Columbia.....	17	2.52		Moorestown.....	11, 12	3.68	6.09
Carterville.....	27, 28	2.95		Clayton.....	12	2.86	
Gainesville.....	27, 28	3.25		Egg Harbor City.....	12	2.95	
Forsyth.....	28	2.32		Salem.....	11	2.90	
Albany.....	27, 28	3.15		Beverly.....	11, 12	3.39	
Atlanta.....	27, 28	2.05		Bordentown.....	12	2.65	
Indiana.				Harrisville.....	12	2.70	
Laconia.....	28	2.05		Imlaystown.....	12	2.60	
Vevay.....	27	2.05		Toms River.....	11, 12	3.35	
Jeffersonville.....	26 to 28	2.39		New Mexico.			
Indian Territory.				Las Vegas.....	23, 24	2.25	
Fort Sill.....	26	2.00		North Carolina.			
Iowa.				Lenoir.....	29	3.10	
Independence.....	2 to 5	7.62	12.87	Statesville.....	29	3.65	
Webster City.....	3 to 5	5.55	11.32	Ohio.			
Do.....	11	2.20		Garrettsville.....	22	2.41	
Do.....	21	2.02		Hiram.....	22	2.05	
Dubuque.....			7.62	Oregon.			
Cresco.....	1 to 3	3.72	7.50	Astoria.....	30	2.70	
Bancroft.....	2, 3	3.53	6.89	Pennsylvania.			
Humboldt.....	21, 22	2.21	6.75	Altoona.....	12, 13	2.12	
Monticello.....	3	2.25	6.31	Germantown.....	12	2.76	
Fort Madison.....	27, 28	2.10		Falleington.....	11	2.07	
Davenport.....	3, 4	2.98		West Chester.....	12	2.60	
Kansas.				Philadelphia.....	11, 12	2.63	
Wakefield.....	1, 2	4.41	9.43	South Carolina.			
Manhattan.....	1	2.97	6.33	Spartanburg.....	28	2.41	
Emporia.....	2, 3	2.84	6.00	Tennessee.			
Do.....	26 to 28	2.39		Nashville.....	17, 18	4.66	6.85
East Norway.....	10	2.20	6.00	Fostoria.....	27	4.00	
Globe.....	28, 29	2.42		Florence Station.....	18	2.29	
Oberlin.....	25	3.20		Hohenwald.....	26, 27	2.11	
Yates Centre.....	26 to 28	2.36		Chattanooga.....	27, 28	3.31	
Wilson.....	9, 10	2.36		Dyersburg.....	18	2.01	
Lebo.....	26 to 28	2.55		Texas.			
Morse.....	29	3.00		Brownsville.....	21, 22	10.76	13.65
Fort Hays.....	9, 10	3.20		Corpus Christi.....	24	3.95	9.24
Brookville.....	10	2.00		Fort Davis.....			7.08
Bunker Hill.....	9	3.10		Rio Grande City.....	21, 22	4.55	6.89
Carneiro.....	10	2.14		Fort Ringgold.....	22	4.06	6.20
Dorrance.....	10	2.15		Corsicana.....	26	3.13	
Ellsworth.....	9	2.50		Virginia.			
Ogallah.....	9	2.00		Marion.....	27 to 29	2.67	
Victoria.....	9	2.20		University of Va.....	28, 29	2.04	
Wakeeney.....	9	2.50		Wytheville.....	28, 29	2.49	
Buffalo Park.....	9	2.00		Variety Mills.....	28	2.08	
Topeka.....	25, 26	2.09		Fort Monroe.....	30	2.18	
Kentucky.				Cape Henry.....	29	2.60	
Greensburg.....	17	2.61	6.43	Norfolk.....	29, 30	2.54	
Frankfort.....	27, 28	2.93		Washington Ter.			
Liberty Hill.....	27	2.13		Olympia.....	30	2.26	
				Wisconsin.			
				Prairie du Chien.....	1 to 3	3.85	9.51
				Madison.....	1, 2	2.07	6.67
				Lancaster.....	1 to 3	2.85	

HAIL.

Under the heading "Local storms" will be found descriptions of the more severe hail storms which have occurred during the month. In addition to these, hail was reported to have fallen in the various states and territories as follows:

California.—Fresno, 22d.

Colorado.—Denver, 1st; Colorado Springs, 6th; Pike's Peak, 6th, 16th, 24th, 25th.

Dakota.—Deadwood, 4th; Bismarck, 5th.

Illinois.—Chicago, 23d; Sycamore, 29th.

Iowa.—Muscatine, 29th.

Kansas.—Wakefield, 12th; Salina, 25th.

Maine.—Eastport, 19th.

Nebraska.—North Platte, 1st.

Montana.—Fort Custer, 12th.

New Hampshire.—Berlin Mills, 7th.

New Jersey.—Salem, 25th, 26th.

New York.—Saratoga, 7th.

Ohio.—Elyria, 23d.

Pennsylvania.—Dyberry, 7th.

Washington Territory.—Fort Spokane, 19th.

Wyoming.—Camp Sheridan, 1st, 23d; Cheyenne, 8th, 12th, 24th.

DROUGHT.

Alabama.—Livingston, Sumter Co.: prior to the 16th the weather was very hot and dry; on the 16th and 17th more than two inches of rain fell.

Arkansas.—Little Rock, 12th: the weather is very dry, but at this late date rain would not be of much benefit to crops; the forest grass is burned and stock has to be fed as in winter.

Georgia.—Augusta: the showers on the 23d broke the drought which has prevailed in this section since August 22d; the absence of rain, however, has been very favorable for cotton picking.

Milledgeville, Baldwin Co., 30th: the protracted drought during the month was very damaging to agricultural interests; sweet potatoes, peas, turnips, and pastures suffered seriously.

Illinois.—Mount Vernon, Jefferson Co.: the rain of the 14th greatly benefited pastures and some kinds of vegetables.

Tolono, Champaign Co., 16th: the worst features of the drought of July and August still continue in this region, notwithstanding the showers which have fallen since the middle of the latter month. Nearly all wells are still exhausted, and farmers are compelled to haul water for stock. At Philo, Sadorus, and other towns in Champaign county, the same conditions exist.

Hillsborough, Montgomery Co., 16th: there is great scarcity of water in this section on account of the severe drought.

Galesburgh, Knox Co., 16th: the drought in this vicinity continues, there having been but one slight shower in three weeks. In some parts of the county there is great scarcity of water.

Monmouth, Warren Co., 16th: nearly half of the wells in this county have failed, and there is but one running stream in the county.

Princeton, Bureau Co.: the rain of the 22d was the first since the 3d; it was of great benefit, but more is needed for pastures.

Pekin, Tazewell Co.: a much needed rain, the first for nearly four weeks, fell on the 22d, ending the drought which prevailed during the greater part of the summer.

The "Monthly Weather Review of the Illinois Weather Service" for September, 1887, states:

The drought of the past season that proved so destructive to the growing crops was broken by daily rainfalls from the 26th to the close of the month. Pastures, late vegetables, and the fall ploughing and seeding have been greatly benefited by these rains.

Indiana.—Vevay, Switzerland Co.: the weather is very dry and dusty; pastures have dried up; water is scarce, and stock is suffering in consequence.

Elkhart, Elkhart Co.: for some time prior to the rain of the 21st drought prevailed in this vicinity; the rain of the above date greatly improved the ground for the reception of fall wheat.

Wabash, Wabash Co., 23d: the drought which prevailed during the greater part of the summer was relieved by the rain of the 22d. On account of the protracted drought much of the winter wheat will have to be resown, involving great expense and labor.

Laconia, Harrison Co.: the first soaking rain since the 9th of June fell on the 26th, 27th, and 28th, breaking the drought and putting the soil in tillable condition.

Iowa.—The following is from "The Daily Gate City" of the 24th, published at Keokuk, Iowa:

Many of the interior towns in Iowa, Missouri, and Illinois are suffering the inconveniences of an inadequate water supply, the continued prevalence of the drought having dried up the creeks and wells, which were partially replenished by the rains of several weeks ago. At that time there had been no rain for six or seven weeks and water was at a decided premium. Crops were damaged, the meadows parched by the sun, and live stock was suffering. Relief was afforded for a short time when the supply again became almost exhausted. The creeks and small streams in southwestern Iowa are nearly dry, and unless there is a rainfall soon people in interior towns will actually suffer. At Pella, on the Rock Island Road, the supply is nearly gone, and water is hauled on the trains from Keokuk. Within a radius of ten miles of Keokuk the supply is short in some localities and live stock is not provided with what it needs.

Fort Madison, Lee Co., 30th: the month has been unusually dry; farmers have had to stop ploughing on account of the dry condition of the soil, and in some places wheat had to be sown the second time. The rain of the 22d moistened the ground sufficiently to permit the resumption of ploughing. At the end of the month the fall wheat was coming up and looking well.

Cedar Rapids, Linn Co., 30th: the water in the Cedar River is still at a very low stage, having risen but little during the month.

Kansas.—Winfield, Cowley Co., 23d: the recent rains have greatly improved vegetation in this part of the state.

Kentucky.—Versailles, Woodford Co., 20th: heavy rains fell during the night of the 17-18th; this put the ground in fair condition for ploughing, but it was not sufficient to replenish the water supply, and farmers are still driving stock long distances for water.

Louisville: the heavy rain which fell throughout the 27th practically ended the drought; it came too late, however, to be of any material good to the crops, but it will renew the supply of water in wells and springs that have been dry for a long time.

Michigan.—Mottville, Saint Joseph Co., 30th: owing to the dry weather the streams are low and wells are failing.

New York.—Lockport, Niagara Co., 11th: reports from Orleans county state that on account of dry weather the potato crop is a failure. Rain is much needed to enable farmers to prepare for seeding fall wheat.

Mississippi.—University, Lafayette Co.: reports from various sections in the state on the 10th showed that drought was general throughout the state and that the cotton crop was suffering seriously. The heavy rain which fell during the

night of the 21st-22d was of great benefit, as the cisterns had run dry and water for stock was becoming scarce; it was also of great benefit to growing crops. Another heavy fall of rain occurred on the 24th, terminating the drought in this vicinity.

Vicksburg, 15th: light rain fell at intervals during the afternoon and evening; this rain ended the drought which had prevailed in this vicinity during the last twenty-eight days.

Missouri.—Fayette, Howard Co.: very little rain fell during the month until the last decade, when steady rains fell to the amount of 3.02 inches, which soaked the ground thoroughly and were of much benefit to pastures and seeding.

Ohio.—Napoleon, Henry Co., 24th: the Maumee River at this point is lower than it has been for the last twenty-five years; streams, wells, and many cisterns are dry.

Wauseon, Fulton Co., 30th: the drought in this locality is not yet entirely broken; the ground has been so dry that the seeding of wheat has been much retarded.

Pennsylvania.—Quakertown, Bucks Co., 1st: ploughing for fall seeding is difficult on account of the surface of the ground being very dry.

Tennessee.—Nashville: the drought of the past two months was broken by the rains on the 17th and 18th. Reports received on the 21st from neighboring counties showed that the heavy rains on the above dates did not extend beyond a radius of twelve miles from Nashville.

Chattanooga: the long continued drought in this section was broken by light rains from the 22d to the 28th.

Texas.—San Antonio, Bexar Co., 8th: reports from Frio county state that as a result of the protracted drought the people in the rural districts have been reduced to a state of destitution.

Vermont.—Newport, Orleans Co., 30th: the water in Lake Memphremagog is lower at this date than it has been at any time for many years; springs which have never been known to fail are now dry.

Virginia.—Rappahannock, Caroline Co., 30th: agricultural interests have been very much injured by the protracted drought in this section of the state; no measurable rain has fallen during the month. The Rappahannock River is unusually low, and nearly all smaller streams and springs are dry.

University of Virginia, Albemarle Co., 30th: on account of the protracted drought the ground is too hard for ploughing, and no grain has been sown in consequence; only 0.31 inch of rain fell from August 25th to September 26th.

West Virginia.—Middlebrook, Randolph Co., 30th: the rains from the 27th to the 29th ended the long and severe drought in this locality; the crops are light in many places, but throughout the mountain districts they gave a fair yield.

WINDS.

The most frequent directions of the wind during September, 1887, are shown on chart ii, by arrows flying with the wind. In the upper Mississippi and Missouri valleys, South Atlantic and-east Gulf states the prevailing directions are mostly from the east, southeast, or south; in New England and at stations along Lakes Erie and Ontario they are generally southwest or west; in the Ohio Valley and middle Atlantic states, north and northeast; in the upper lake region and at Rocky Mountain stations, variable; on the Pacific coast, north, northwest, or west.

HIGH WINDS (in miles per hour).

The maximum velocities of the wind for September, 1887, at Signal Service stations where the movements are registered, are given in the table of miscellaneous meteorological data. No velocities of fifty or more miles per hour, other than those given in the table referred to, occurred during the month, with the exception of Brownsville, Tex., 60 miles, se., on the 22d; and Mount Washington, N. H., where velocities exceeding fifty miles were frequent; besides the maximum velocity of 82 miles,

sw., on the 7th, at the latter station, there were recorded the following: 81 miles, nw., 8th; 78, nw., 21st; and 79, nw., 22d.

LOCAL STORMS.

Genoa, Nance Co., Nebr.: the heavy rains accompanying the unusually severe storm which occurred on the 4th resulted in much damage to crops in the lowlands; nearly all bridges in this vicinity were washed away.

Key West, Fla.: high northeasterly winds prevailed on the 1st and 2d; on the latter date a maximum velocity of forty-two miles per hour was recorded.

Saint Vincent, Minn.: a severe thunder-storm occurred during the forenoon of the 4th; high winds prevailed from 1.45 to 8.30 p. m.; the maximum velocity, thirty miles per hour from the south, occurred at 8.15 p. m.

Palmyra, Jefferson Co., Wis.: during the evening of the 4th this section was visited by a severe storm of rain and hail, the latter causing serious injury to the tobacco crop.

Sioux Falls, Minnehaha Co., Dak.: an unusually heavy rain storm, accompanied by intense electrical discharges, prevailed